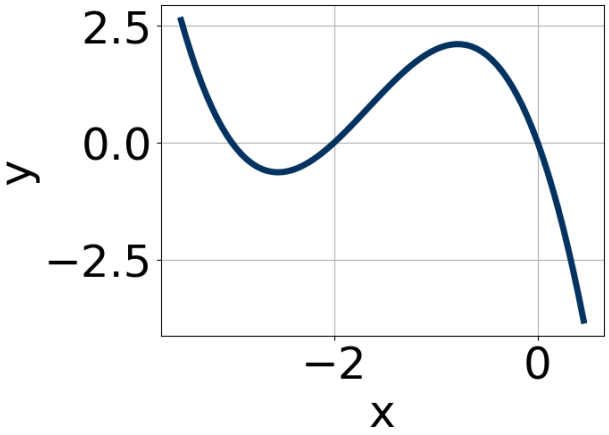
1. Which of the following equations *could* be of the graph presented below?



A. $-19x^{11}(x+2)^9(x+3)^9$

B. $8x^7(x+2)^{11}(x+3)^9$

C. $-2x^9(x+2)^{10}(x+3)^8$

D. $-19x^5(x+2)^8(x+3)^9$

E. $15x^9(x+2)^6(x+3)^7$

---

2. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form ax^3+bx^2+cx+d.

$$\frac{-3}{2}, -7, \text{ and } \frac{7}{2}$$

A. $a \in [1,7], b \in [20,23], c \in [-77,-71],$ and $d \in [-149,-143]$

B. $a \in [1,7], b \in [-20,-13], c \in [-77,-71],$ and $d \in [147,150]$

C. $a \in [1,7], b \in [6,15], c \in [-120,-118],$ and $d \in [147,150]$

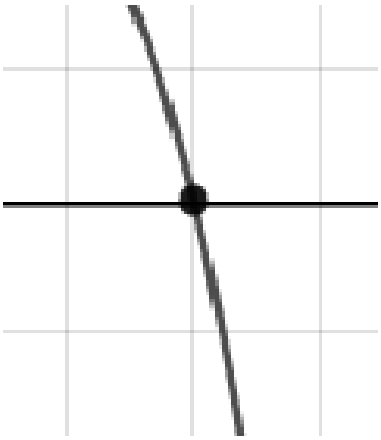
D. $a \in [1,7], b \in [20,23], c \in [-77,-71],$ and $d \in [147,150]$

E. $a \in [1,7], b \in [-52,-47], c \in [158,164],$ and $d \in [-149,-143]$

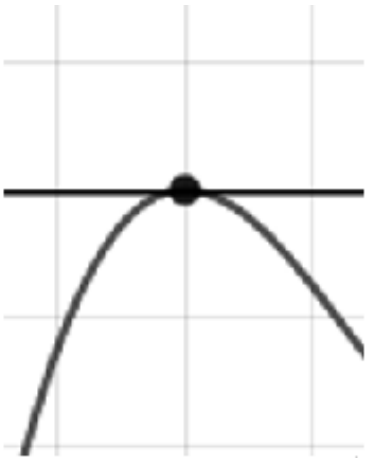
---

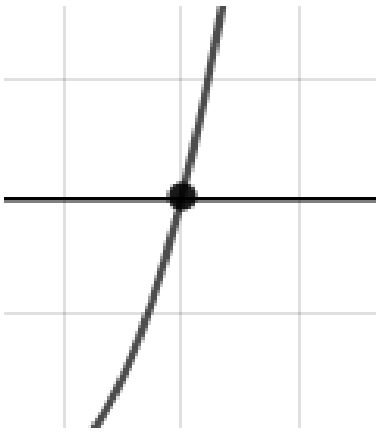
3. Describe the zero behavior of the zero $x=-7$ of the polynomial below.

$$f(x) = -2(x-4)^8(x+4)^5(x+7)^{10}(x-7)^9$$

A. 

C. 

B. 

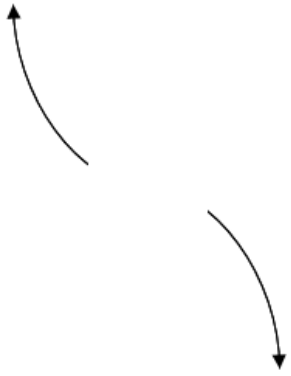
D. 

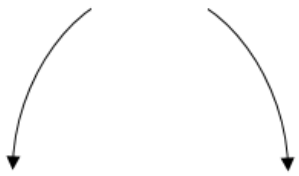
E. None of the above.

---

4. Describe the end behavior of the polynomial below.

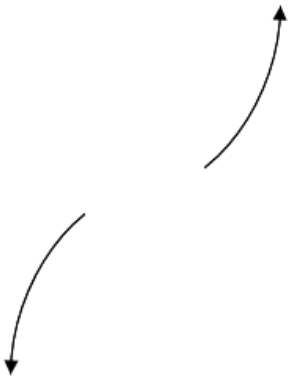
$$f(x) = 7(x-7)^2(x+7)^3(x-8)^5(x+8)^5$$

A. 

B. 

C.

D.



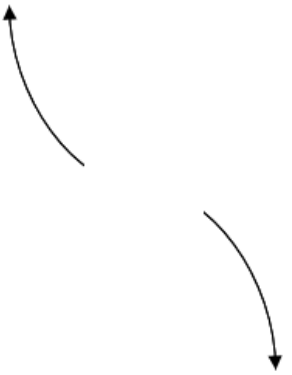
E. None of the above.

---

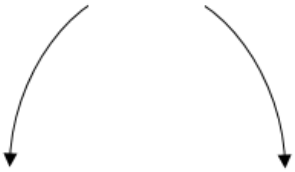
5. Describe the end behavior of the polynomial below.

$$f(x) = 2(x-2)^4(x+2)^7(x-4)^2(x+4)^2$$

A.

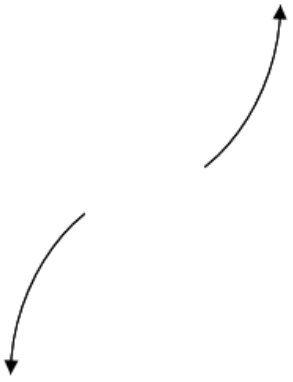


B.



C.

D.



E. None of the above.

---

6. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-4 + 4i \text{ and } 4$$

A. $b \in [0.9, 3.2], c \in [-3, 3],$ and $d \in [-18, -14]$

B. $b \in [0.9, 3.2], c \in [-10, -7],$ and $d \in [13, 21]$

C. $b \in [-7.8, -3.9], c \in [-3, 3],$ and $d \in [121, 134]$

D. $b \in [3.1, 5.5], c \in [-3, 3],$ and $d \in [-130, -123]$

E. None of the above.

---

7. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$-3, \frac{-5}{2}, \text{ and } \frac{-1}{5}$$

A. $a \in [10, 15], b \in [51, 61], c \in [80, 87],$ and $d \in [11, 19]$

B. $a \in [10, 15], b \in [-53, -46], c \in [53, 71],$ and $d \in [11, 19]$

C. $a \in [10, 15], b \in [-57, -54], c \in [80, 87],$ and $d \in [-17, -7]$

D. $a \in [10, 15], b \in [-3, 6], c \in [-81, -75],$ and $d \in [-17, -7]$

E. $a \in [10, 15], b \in [51, 61], c \in [80, 87],$ and $d \in [-17, -7]$

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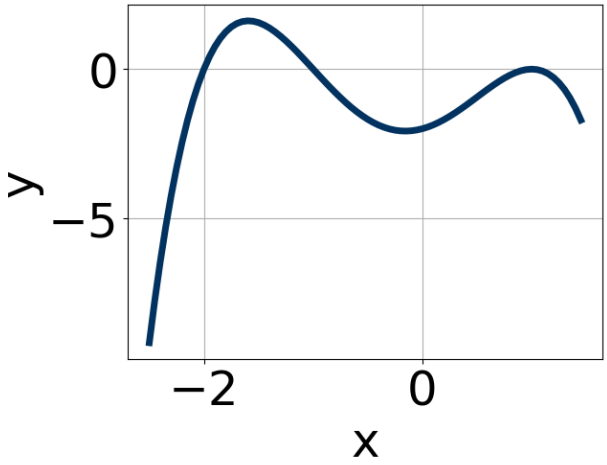
8. Which of the following equations *could* be of the graph presented below?



A. $-15(x-1)^8(x+1)^{11}(x+2)^7$

B. $-11(x-1)^8(x+1)^6(x+2)^9$

C. $16(x-1)^8(x+1)^9(x+2)^{11}$

D. $-14(x-1)^7(x+1)^8(x+2)^9$

E. $11(x-1)^4(x+1)^{11}(x+2)^4$

---

9. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-3 - 4i \text{ and } -2$$

A. $b \in [-1, 5], c \in [1.8, 5.3],$ and $d \in [5.8, 6.4]$

B. $b \in [-1, 5], c \in [5.2, 8.8],$ and $d \in [7.7, 10.7]$

C. $b \in [4, 9], c \in [35.8, 38.9],$ and $d \in [46.8, 52.1]$

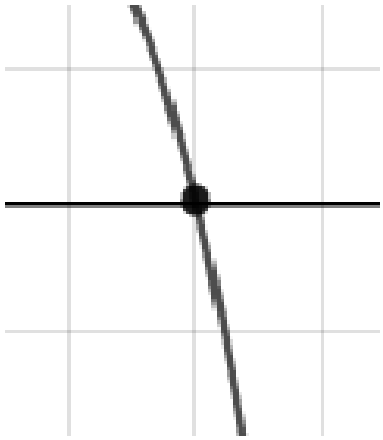
D. $b \in [-9, -3], c \in [35.8, 38.9],$ and $d \in [-50.4, -49]$

E. None of the above.

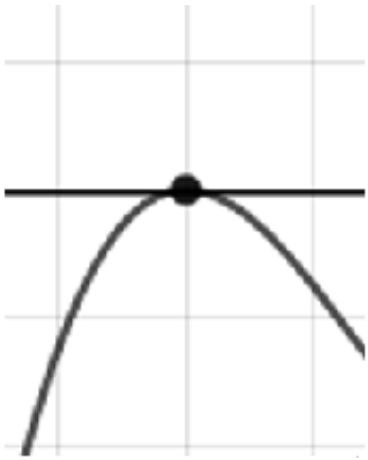
---

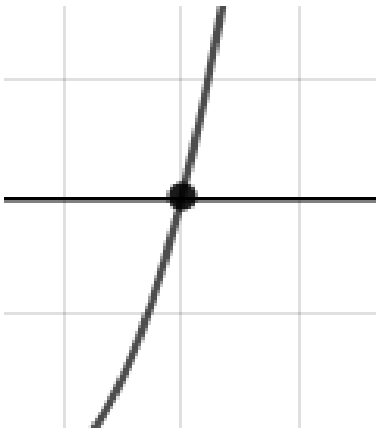
10. Describe the zero behavior of the zero $x = -8$ of the polynomial below.

$$f(x) = -2(x-8)^8(x+8)^{11}(x+9)^9(x-9)^{13}$$

A. 

C. 

B. 

D. 

E. None of the above.

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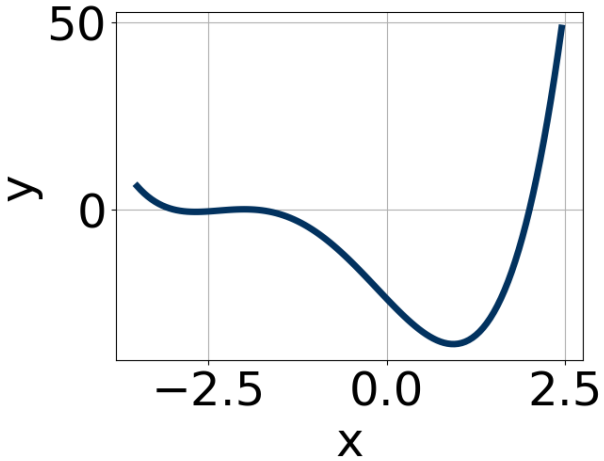
11. Which of the following equations *could* be of the graph presented below?



A. $19(x+2)^7(x-2)^4(x+3)^9$

B. $20(x+2)^{10}(x-2)^{8}(x+3)^{7}$

C. $13(x+2)^{4}(x-2)^{11}(x+3)^{11}$

D. $-18(x+2)^{4}(x-2)^{7}(x+3)^{4}$

E. $-4(x+2)^{10}(x-2)^{11}(x+3)^{5}$

---

12. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form ax^3+bx^2+cx+d.

$$\frac{1}{4}, \frac{7}{5}, \text{ and } 2$$

A. $a \in [17,26], b \in [68,75], c \in [69,74], \text{ and } d \in [10,16]$

B. $a \in [17,26], b \in [-7,-6], c \in [-59,-56], \text{ and } d \in [-18,-13]$

C. $a \in [17,26], b \in [-73,-66], c \in [69,74], \text{ and } d \in [-18,-13]$

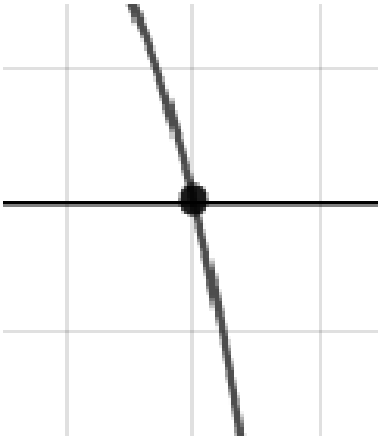
D. $a \in [17,26], b \in [-73,-66], c \in [69,74], \text{ and } d \in [10,16]$

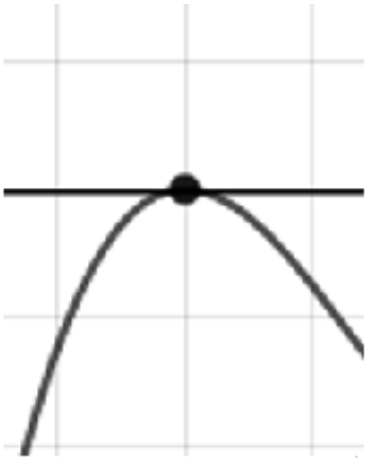
E. $a \in [17,26], b \in [-66,-58], c \in [34,45], \text{ and } d \in [10,16]$

---

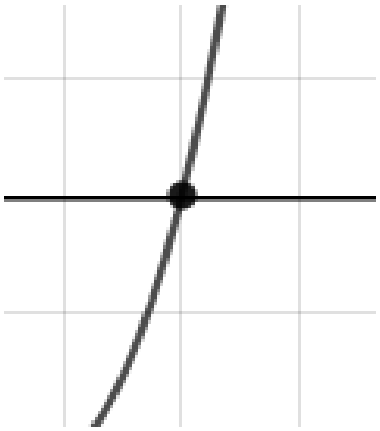
13. Describe the zero behavior of the zero $x=2$ of the polynomial below.

$$f(x) = -9(x-7)^{7}(x+7)^{4}(x-2)^{12}(x+2)^{9}$$

A. 

B. 

C. 

D. 

E. None of the above.

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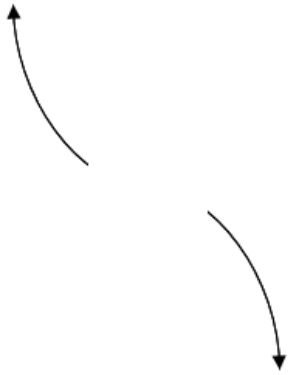
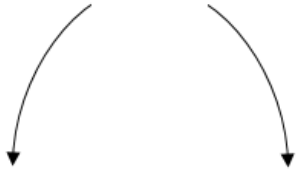
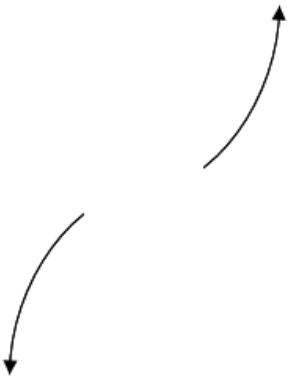
14. Describe the end behavior of the polynomial below.

$$f(x) = 8(x-9)^2(x+9)^5(x-7)^4(x+7)^6$$

A. 

B. 

C. 

D. 

E. None of the above.

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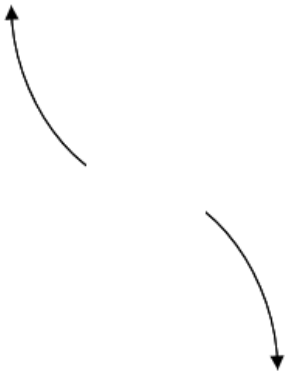
15. Describe the end behavior of the polynomial below.

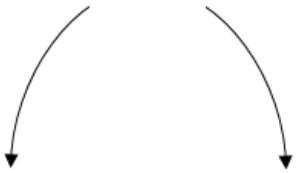
$$f(x) = 9(x+5)^3(x-5)^6(x-3)^5(x+3)^7$$

A.

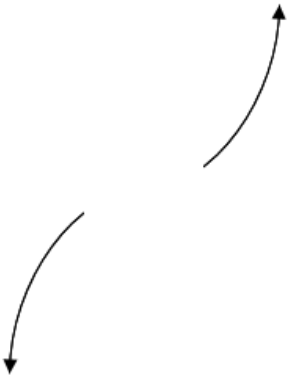


C.

B.



D.



E. None of the above.

---

16. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-2 + 5i \text{ and } 3$$

A. $b \in [-0.1, 2.4], c \in [15, 24],$ and $d \in [-94, -80]$

B. $b \in [-2.5, -0.9], c \in [15, 24],$ and $d \in [75, 89]$

C. $b \in [-0.1, 2.4], c \in [-8, -3],$ and $d \in [10, 24]$

D. $b \in [-0.1, 2.4], c \in [-2, 5],$ and $d \in [-10, -2]$

E. None of the above.

---

17. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-3}{2}, \frac{-7}{3}, \text{ and } -4$$

A. $a \in [1, 13], b \in [42, 51], c \in [111, 117],$ and $d \in [-87, -83]$

B. $a \in [1, 13], b \in [-4, 2], c \in [-76, -68],$ and $d \in [84, 88]$

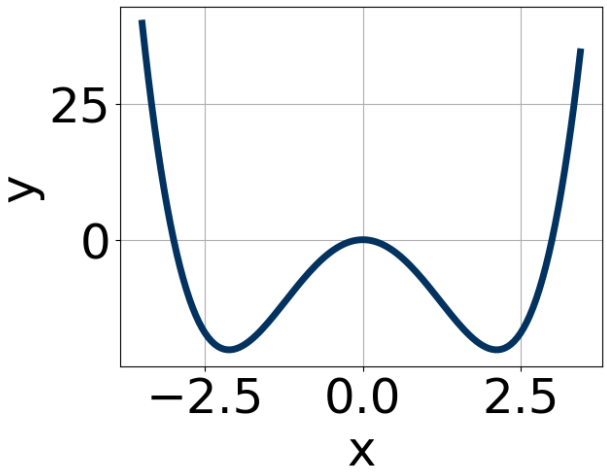
C. $a \in [1, 13], b \in [-50, -41], c \in [111, 117],$ and $d \in [-87, -83]$

D. $a \in [1, 13], b \in [42, 51], c \in [111, 117],$ and $d \in [84, 88]$

E. $a \in [1, 13], b \in [28, 30], c \in [-3, 5],$ and $d \in [-87, -83]$

---

18. Which of the following equations *could* be of the graph presented below?



A. $18x^8(x+3)^9(x-3)^7$

B. $-19x^4(x+3)^5(x-3)^4$

C. $19x^4(x+3)^8(x-3)^{11}$

D. $8x^5(x+3)^8(x-3)^7$

E. $-3x^4(x+3)^{11}(x-3)^7$

---

19. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$5 + 2i \text{ and } 4$$

A. $b \in [-6, 2], c \in [-9.4, -7.5],$ and $d \in [18, 22]$

B. $b \in [-21, -8], c \in [67.5, 70.9],$ and $d \in [-126, -113]$

C. $b \in [-6, 2], c \in [-8, -3.8],$ and $d \in [5, 12]$

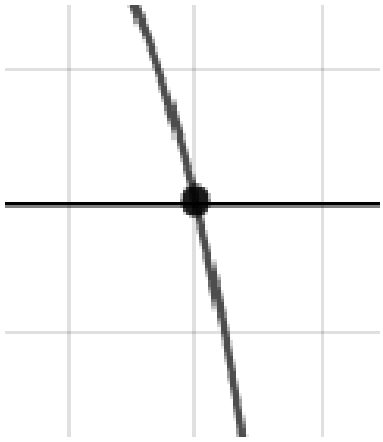
D. $b \in [12, 21], c \in [67.5, 70.9],$ and $d \in [115, 119]$

E. None of the above.

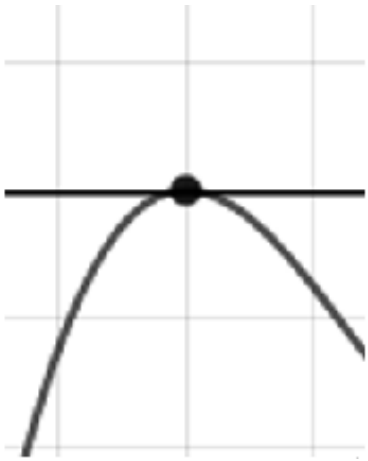
---

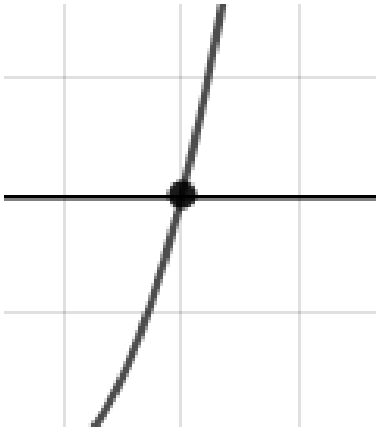
20. Describe the zero behavior of the zero $x = 2$ of the polynomial below.

$$f(x) = 8(x + 2)^2(x - 2)^7(x - 4)^9(x + 4)^{11}$$

A. 

C. 

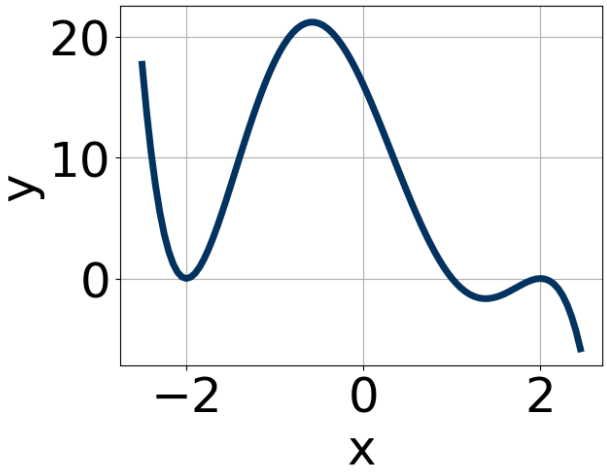
B. 

D. 

E. None of the above.

---

21. Which of the following equations *could* be of the graph presented below?



A. $-13(x-2)^{10}(x+2)^{5}(x-1)^{10}$

B. $-14(x-2)^{10}(x+2)^{9}(x-1)^{11}$

C. $18(x-2)^{10}(x+2)^{4}(x-1)^{10}$

D. $-6(x-2)^{10}(x+2)^{4}(x-1)^{7}$

E. $16(x-2)^{8}(x+2)^{8}(x-1)^{5}$

---

22. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form ax^3+bx^2+cx+d.

$$\frac{-3}{5}, \frac{7}{4}, \text{ and } \frac{1}{3}$$

A. $a \in [53,63], b \in [-91,-78], c \in [-46,-37],$ and $d \in [-21,-18]$

B. $a \in [53,63], b \in [-91,-78], c \in [-46,-37],$ and $d \in [20,23]$

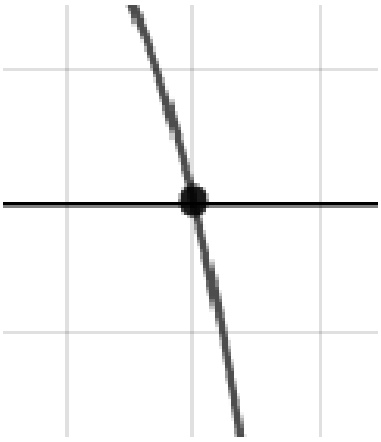
C. $a \in [53,63], b \in [83,95], c \in [-46,-37],$ and $d \in [-21,-18]$

D. $a \in [53,63], b \in [49,51], c \in [-88,-79],$ and $d \in [20,23]$

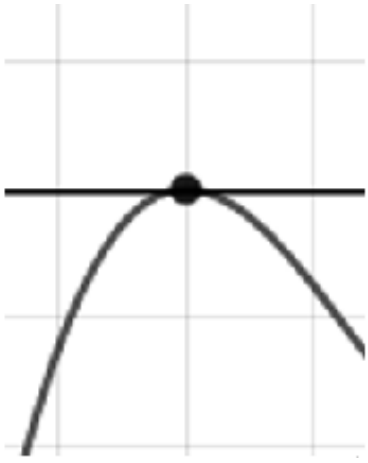
E. $a \in [53,63], b \in [-165,-159], c \in [107,112],$ and $d \in [-21,-18]$

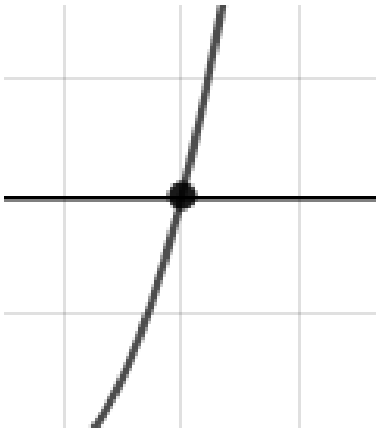
23. Describe the zero behavior of the zero $x = 8$ of the polynomial below.

$$f(x) = 3(x+8)^8(x-8)^{11}(x-7)^9(x+7)^{13}$$

A. 

C. 

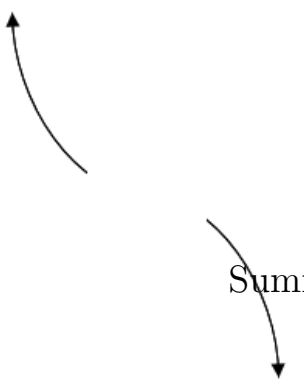
B. 

D. 

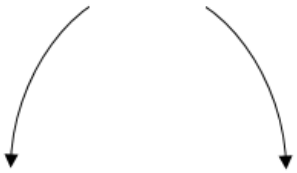
E. None of the above.

24. Describe the end behavior of the polynomial below.

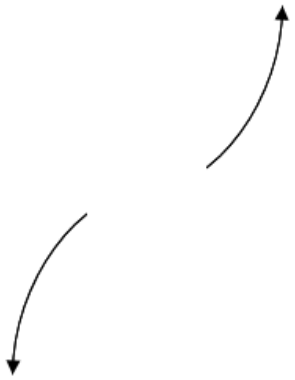
$$f(x) = -4(x+6)^4(x-6)^5(x+2)^5(x-2)^5$$



B.



D.



C.

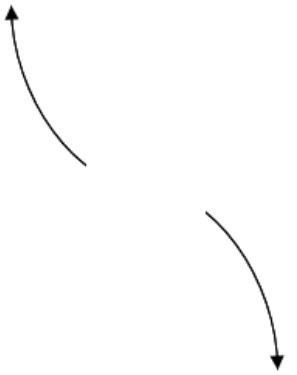
E. None of the above.

---

25. Describe the end behavior of the polynomial below.

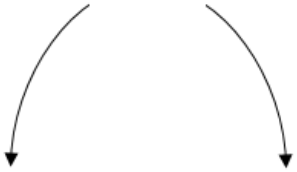
$$f(x) = 4(x+2)^5(x-2)^8(x+9)^3(x-9)^3$$

A.

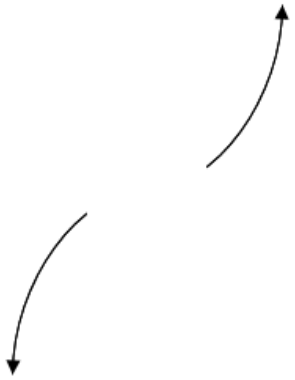


C.

B.



D.



E. None of the above.

26. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-5 + 5i \text{ and } -1$$

A. $b \in [-16, -10], c \in [59, 67],$ and $d \in [-58, -48]$

B. $b \in [4, 19], c \in [59, 67],$ and $d \in [46, 58]$

C. $b \in [-8, 6], c \in [-1, 13],$ and $d \in [3, 6]$

D. $b \in [-8, 6], c \in [-6, 3],$ and $d \in [-7, 3]$

E. None of the above.

27. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-2}{5}, \frac{-3}{2}, \text{ and } \frac{1}{5}$$

A. $a \in [48, 62], b \in [44, 50], c \in [-44, -38],$ and $d \in [1, 10]$

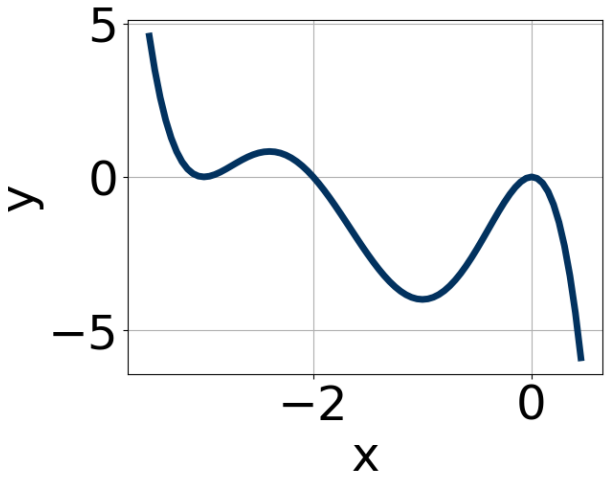
B. $a \in [48, 62], b \in [-106, -98], c \in [42, 50],$ and $d \in [-8, 2]$

C. $a \in [48, 62], b \in [79, 88], c \in [7, 18],$ and $d \in [-8, 2]$

D. $a \in [48, 62], b \in [79, 88], c \in [7, 18],$ and $d \in [1, 10]$

E. $a \in [48, 62], b \in [-85, -84], c \in [7, 18],$ and $d \in [1, 10]$

28. Which of the following equations *could* be of the graph presented below?



A. $14x^{10}(x+3)^{10}(x+2)^5$

B. $18x^{10}(x+3)^4(x+2)^4$

C. $-11x^9(x+3)^6(x+2)^5$

D. $-13x^8(x+3)^{10}(x+2)^5$

E. $-8x^{11}(x+3)^{10}(x+2)^{10}$

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29. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$4 - 3i \text{ and } 3$$

A. $b \in [9, 12], c \in [40, 52],$ and $d \in [74, 86]$

B. $b \in [-14, -5], c \in [40, 52],$ and $d \in [-77, -72]$

C. $b \in [0, 3], c \in [0, 5],$ and $d \in [-9, -8]$

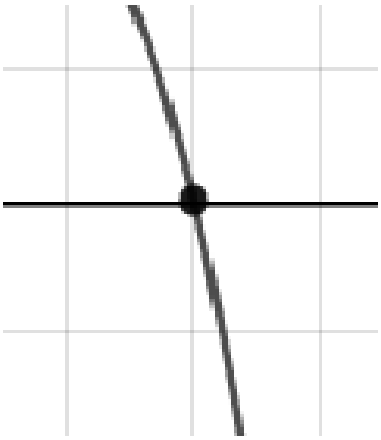
D. $b \in [0, 3], c \in [-10, -6],$ and $d \in [7, 16]$

E. None of the above.

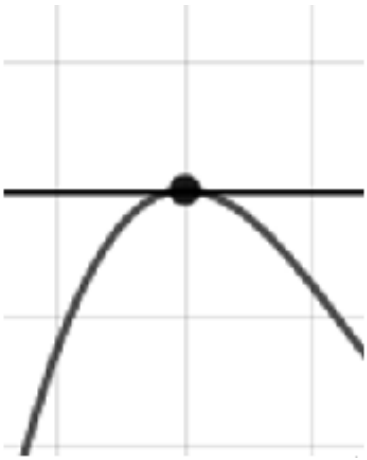
---

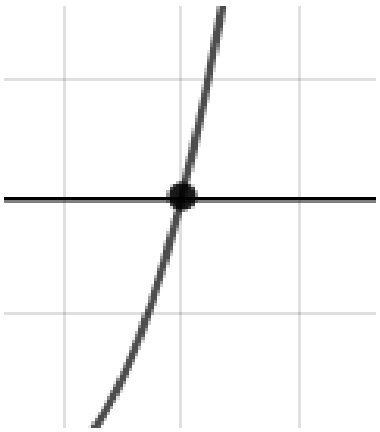
30. Describe the zero behavior of the zero $x = 3$ of the polynomial below.

$$f(x) = 3(x-3)^5(x+3)^{10}(x+8)^5(x-8)^6$$

A. 

C. 

B. 

D. 

E. None of the above.
